Space Weather Forecast

Issued on Friday, 19 August 2022 at 12:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor or Moderate storms on days 1 or 2 (19th/20th Aug). Chance of further Moderate flares (R1-R2 Radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with two Moderate class flares observed in the past 24 hours from a modestly sized but magnetically complex sunspot in the southwest quadrant. There are eight sunspot regions on the visible disc, including new sunspots that have developed in the east disc however they are generally smaller are simpler than the main spot. Whilst the flaring sunspot does appear to be simplifying, the reduced viewing angle with it's currently location potentially hides additional complexity. This region has produced a couple of CMEs (coronal mass ejections), in the last 24 hours, however these are not expected to be Earth-directed.

Solar Wind / Geomagnetic Activity: The solar wind has been elevated to strong during this period, around 550-600 km/s. The magnetic field generally eased from Moderate to Weak levels, but with some fluctuations in the north-south component, resulting in brief spells of southward (negative) pointing field. Geomagnetic activity was at Minor Storm 18/1200-2400 UTC, then declined to Unsettled to Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low to Moderate with further Moderate class flares likely and a slight chance of strong flares, primarily from the sunspot in the southwest quadrant.

Solar Wind / Geomagnetic Activity: Glancing CME arrivals are possible on days 1-2 (19th-20th) from recent CMEs. Solar winds are likely to remain elevated through much of this period due to ongoing fast winds from a large coronal hole, perhaps declining days 3-4 (21st-22nd). A further small coronal hole may result in a further enhancement thereafter. Corresponding geomagnetic activity is expected to be Quiet to Unsettled, with a chance of Active to G1/Minor Storm, perhaps G2/Moderate Storm intervals on days 1 and 2 (19th and 20th) from any CME arrival. Towards the end of the period activity is likely to become predominantly Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at or near background with no solar radiation storms occurring. Although there is a slight chance of this rate increasing and potentially exceeding the S1 level from any Moderate or Strong flares from the flaring sunspot near the southwest.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	50	10	10
Strong	G3	No	5	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	50	40	30
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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